About Our CONTRIBUTORS

A. H. BASSMAN, D.D.S. was graduated in 1927 from Marquette University School of Dentistry where he has taught ceramics and crown and bridge construction for nine years. He has a general dental practice. Doctor Bassman's practical article describing a cast stress-breaker is his initial publication in this magazine.

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THEODOR BAUM, (Dr. med. dent., 1920, Heidelberg, Germany; D.D.S., 1935, University of Illinois College of Dentistry) has previously written for German publications but he is making his introductory publication in the American dental literature in this issue. Doctor Baum is a general practitioner. He was one of the first to receive a doctor's degree in dentistry in Germany where dentistry is considered a branch of medicine. Previously, dentistry had not attained the rank of a dignified profession worthy of a degree to confer on dental practitioners.

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CLARENCE FRANK TUMA, D.D.S. (Western Reserve University School of Dentistry, 1928) offers another of his many practical suggestions to our readers. This time an oil bath technique for thermoplastics. In February of this year, he told us about an ingenious NON-CLOGGING SALIVA EJECTOR PIPE, and in July, 1936, he contributed a technique for STAINLESS STEEL WROUGHT CLASPS. His publications with us go back to 1932, the first year of the reorganized and rejuvenated 44-year old DENTAL DIGEST.

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JACOB H. GREENBERG, D.D.S. (University of Buffalo School of Dentistry, 1927) is a general practitioner and another newcomer to our pages. Stabilization of full lower dentures is a constant and perennial problem, and it is hoped that Doctor Greenberg's technique in this issue will prove helpful.

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STERLING T. BOWEN, D.D.S. attended Northwestern University for four years and the University of Southern California for two years (Class of 1932). In March of this year, Doctor Bowen, a general practitioner, described his impression technique for immediate restorations. This month his story is about porcelains.

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Edward J. Ryan, B.S., D.D.S., *Editor*
Ethel H. Davis, A.B., *Assistant Editor*
708 Church Street, Evanston, Illinois

[SEE PAGE 496 FOR SUBSCRIPTION DATA, ETC.]

Report on the Action of a Sclerosing Agent for Carious Dentine

THEODOR BAUM, D.D.S., Chicago

THE PURPOSE OF THIS paper is to discuss a therapeutic agent, tiranal, which has been used in Europe for the last six years as a dentine sclerosing agent, especially in caries profunda. To prevent pathologic changes and subsequent loss of vitality of the pulp, as a result of advanced caries, various methods have been utilized. The usually accepted methods employ disinfectants and antiseptics, such as thymol, silver nitrate, or xylol, as therapeutic applications when a thin layer of dentine remains over the pulp.

Review of the Literature

Schroeder[1] (1931) introduced tiranal, a solution which, he reported, transformed the organic carious dentine into an inorganic substance. Schroeder states:

> It impregnates the various dentine to the ultimate ramifications of the tubules and diffuses eventually to the pulp, without damaging the latter. It transforms the carious dentine to a hard solid material which no longer serves as a bacterial medium and prevents fermentation and autolysis. Through this transformation, the affected area becomes a nonconductor and, therefore, is not sensitive to pain stimuli.

Schroeder gives as an active principle of the solution a silicon ester, to which are added chloramine, as an antiseptic, and specially selected resins, to control the penetrativeness of the ester.

Schilling[2] (1933) reported on the treatment of twenty-two teeth with tiranal and he arrived at the following conclusions: (1) Thirteen of the twenty-two teeth showed a hypersensitivity to the electric pulp test. (2) Histologic examination of the pulps showed that tiranal caused irritation and harm to the pulp. Odontoblastic changes, dense connective tissue with poorly-staining nuclei and areas of infiltration were reported. Two cases showed gangrenous pulps.

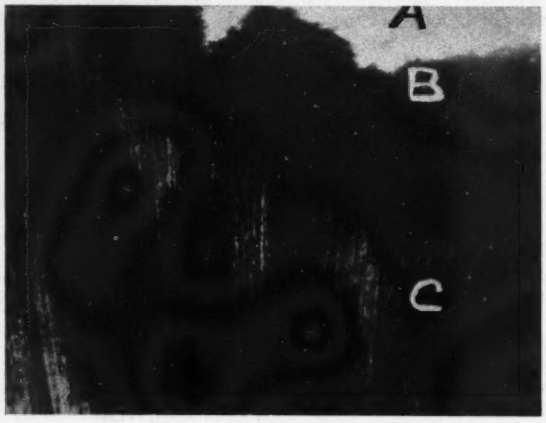

Fig. 1—Photomicrograph of a ground section of a human molar showing effects of sclerosing agent on a noncarious area of dentine (X 60). A, Cavity preparation; B, floor of cavity showing intense staining reaction due to superficial penetration of drug; C, normal dentine showing slight surface penetration of stain.

These observations by Schilling initiated a series of criticisms by various investigators who strenuously attacked Schilling's work.

Flohr[3], Lehner[4], Michaelis[5], and Davidoff[6] are of the opinion that the histologic observations of Schilling cannot be attributed to tiranal. The cases used for the evaluation of the treatment probably were not selective. The two cases of gangrenous pulps were probably pathologic prior to treatment with tiranal.

Michaelis[5] in several cases accidentally exposed pulps and directly capped them with tiranal. These pulps reacted normally to the faradic current weeks and months following the capping.

Flohr[3] reported similar results in eight cases, and is of the opinion that a pulp which is found to be gangrenous subsequent to tiranal treatment was in all probability undergoing necrosis prior to the treatment with tiranal. This is substantiated by an abundance of clinical cases which were studied histologically.

Lehner[4] showed by *in vitro* experiments that a carious tooth, treated with tiranal is more resistant to the action of 5 per cent nitric acid than a noncarious tooth which also has been immersed in tiranal. Lehner is of the opinion that tiranal is effective only in carious dentine.

Tuchler[7] reported on the use of ti-

[1]Schroeder, Hermann: Neue Wege zur Behandlung der caries profunda, Zahnaerztliche Rundschau, September, 1931. Bemerkungen zu "Die andere Seite von Tiranal," Zahnaerztliche Rundschau, number 25, 1932.

[2]Schilling: Klinische und histologische Untersuchungen über indirekte Pulpa-Ueberkappungs Methoden mit Beruecksichtigung des Tiranals, Schweizer Monatschrift fuer Zahnheilkunde, 1933.

[3]Flohr, Walter: Tiranal, seine Wirkung auf Dentin und Pulpa im klinishchen und histologischen Bilde, Zahnaerztliche Rundschau, June, 1935. Eine histopathologische Studie zur Frage der direkten Einwirkung des Tiranals auf die Pulpa, Deutsche Zahnaerztliche Wochenschrift, 1935.

[4]Lehner, Rudolf: Die praktische Anwendung des Tiranals in der Zahnheilkunde, Vierteljahrschrift fuer Zahnheilkunde, March, 1933.

[5]Michaelis, Hildegard: Untersuchungen und Erfahrungen mit Tiranal, Deutsche Zahnaerztliche Wochenschrift, number 20, 1932.

[6]Davidoff, S.: Einiges ueber Tiranal, Zahnaerztliche Rundschau, August, 1932.

[7]Tuchler, Heinz: Einiges ueber die Erfolgsicherheit und neue Moeglichkeiten der Tiranal-Indikation, Deutsche Zahnaerztliche Wochenschrift, March, 1934. Systematische Versuche ueber Wirksamkeit des Tiranals als oertliches Caries-Prophylekticum, Deutsche Zahnaerztliche Wochenschrift, 1936.

ranal as an effective prophylactic agent to arrest early carious lesions. The experiment was performed on patients between the ages of 8 and 25 years.

Muench[8] recommends tiranal as a protective under silicate restorations.

Gins found that carious dentine treated with tiranal was sterile.

Methods and Materials

In the investigations to be described, I was assisted by Doctors Robert G. Kesel, Maynard K. Hine, and Murray M. Hoffman—all of the University of Illinois College of Dentistry. Forty-four cases of caries profunda, representing anterior and posterior teeth, were treated with tiranal[9], according to the following directions as specified by Schroeder[1]:

1. Undermined enamel and superficial parts of carious dentine were removed.

2. The cavity was thoroughly dried and so maintained. Wherever possible the rubber dam was utilized.

3. With the aid of thoroughly dry, clean, and acid-free, curved cotton pliers, or of a curved medicine dropper, the tiranal was applied one drop at a time to the carious portions at intervals of two or three minutes, until no further absorption of the liquid was noted. This application varied with the amount of carious material left *in situ*.

4. A fine pellet of cotton was soaked in the tiranal and sealed in the cavity under oxyphosphate cement.

5. Pulp tests for vitality were made prior to tiranal administration and at subsequent sittings.

6. In those cases in which hypersensitivity was still present at the second sitting, a second application of tiranal was made following removal of remaining softened, decayed material.

7. The intervals between the sittings varied from three days to one week.

8. It is imperative that a correct diagnosis of the underlying disturbance be made; hence, cases presented with passive hyperemia, probable pulp exposure, and all more advanced disease of the pulp were excluded from this study. Only teeth with vital healthy pulps were selected for treatment.

9. The cavity preparation was made and completed only when the affected carious area was hardened and gave the typical click of hardened dentine on scratching with a sharp, well-tempered explorer.

10. CAUTION: *This drug is a powerful caustic and should not be allowed to touch the soft tissues. It should be sealed in the tooth with cement, not gutta-percha.*

The procedure described here was followed also by dental associates, in their respective offices in Chicago, in the treatment of thirteen patients. Fifty-seven patients were treated in all.

Laboratory Procedure — Incisors, cuspids, and molars, representing a total of six carious teeth, were extracted without any previous treatment of the carious cavities. The superficial carious material was removed with a sharp spoon. Tiranal was applied within the cavity using the same method employed in the clinical procedure. The tiranal was left in the extracted teeth from one to three days. Each tooth was cut into two parts by a longitudinal section through the lesion. The controls are given in the accompanying table.

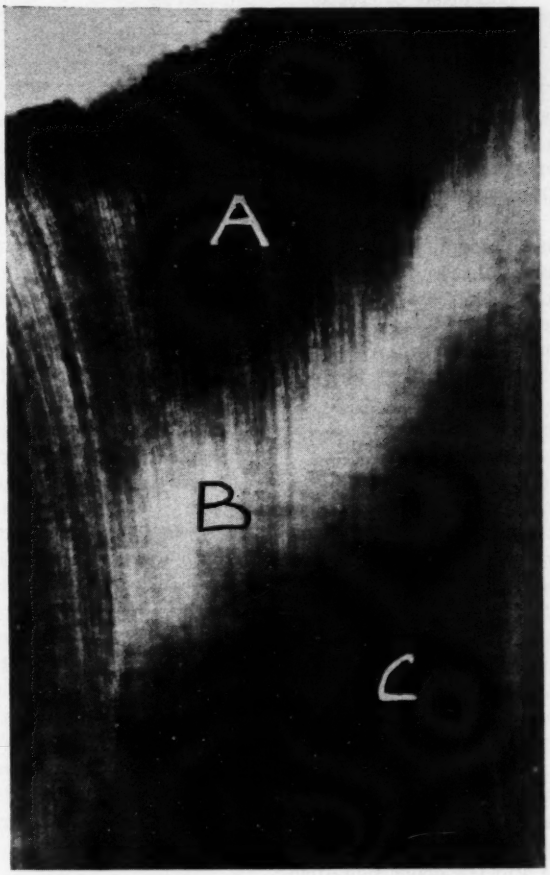

Fig. 2—Photomicrograph of a ground section of a human molar showing the effects of tiranal in a carious area. A, Zone immediately underlying cavity stained heavily; B, natural sclerotic zone which stains very lightly; C, normal dentine which stains darker than zone B, but not so dark as zone A (X 60).

[8]Muench, F. F.: Schutz der Pulpa vor Silikatzement, Zahnaerztliche Rundschau, January, 1933.

[9]The Tiranal for this investigation was supplied by the Odol Chemical Corporation, Chicago.

Controls

Name	Condition of Teeth	Drug Used	Staining
A	Caries Absent	None	Staining
B	Caries Absent	Tiranal	Staining
C	Caries Present	None	Staining

According to the principles of Schoenbeck's[10] staining method, which he reports to be specific for silicon, the following procedure was employed:

1. Stained in aqueous eosin, 0.5 per cent, for thirty minutes.
2. Washed in 70 per cent alcohol for thirty minutes.
3. Counterstained with polychrome methylene blue (Unna's) for twenty-four hours.
4. Washed in running water for thirty minutes.
5. Ground sections of these teeth, from 30 to 50 microns in thickness were prepared on Black's grinding machine by Mr. Emil Matt of the Histology Department of the University of Illinois College of Dentistry.
6. The sections were cleaned in xylol and mounted for microscopic study in gum dammar.

Nine teeth were used as controls and the same method of preparation for histologic examination was employed as described. One tooth, an upper molar, had distal and mesial carious lesions; one cavity was treated with tiranal and the other remained untreated. The tooth was then subjected to the histologic technique.

Clinical Results

The softened decayed dentine was found to be hardened and gave the characteristic click with the steel explorer. The color had changed from the usual brownish pigmentation to a grayish yellow. The carious material, depending on its consistency, had contracted away from the healthy dentine. This finding was especially prevalent in the teeth of the younger patients. The sensitivity of the exposed treated dentine was considerably lowered. It was found that subsequent cavity preparation could be done with little discomfort and minimum pain to the patient. In those cases in which pain was still present following the initial application, it was noted that a greater amount of carious material was left than in those cases in which no high sensitivity was present. On further removal of carious material, however, and after a second application of tiranal, the hypersensitivity was reduced in most cases.

In all cases in which my patients were examined from three to six months following the therapy, no pulpal complications were present, as evidenced by electric pulp tests.

In one case, submitted by Doctor J. Berman, the pulp of a second upper molar of an 11 year old patient, a pulpitis was noted six months following treatment in a deep cavity. In the same patient, the second molar of the opposite side was also treated and no undue symptoms were noted after the six months' interval. This apparent discrepancy can be explained, in my opinion, on the probability that the diseased pulp resulted from pulpal irritation existing prior to this therapy. Flohr[3] explained Schilling's[2] failures on the same basis.

Histologic Results

1. In the teeth used for histologic study, the teeth (a) without caries in which (b) the cavity was prepared and (c) tiranal was not used but (d) staining was done, the enamel did not stain and the dentine did not stain (Fig. 1).

2. Those teeth in which (a) caries was absent, (b) the cavity prepared, (c) tiranal was used, and (d) staining done, the enamel did not stain but the dentine showed slight penetration of from 25 microns to 150 microns of a pale blue coloration. The most intense coloration was found at the base of the cavity.

3. In the teeth in which (a) caries was present and (b) staining done but (c) tiranal was not used, the enamel did not stain. The dentine showed a penetration of approximately 100 microns of light bluish color. This penetration was uneven and appeared to be superficial.

4. In the teeth (a) with caries in which (b) tiranal was used and (c) staining done, the enamel did not stain. In the dentine, the staining effect was divisible into three apparent zones. The stain appeared to have colored an area which is characteristic and typical of caries in dentine. This area was at the base of the cone at the dentino-enamel junction and

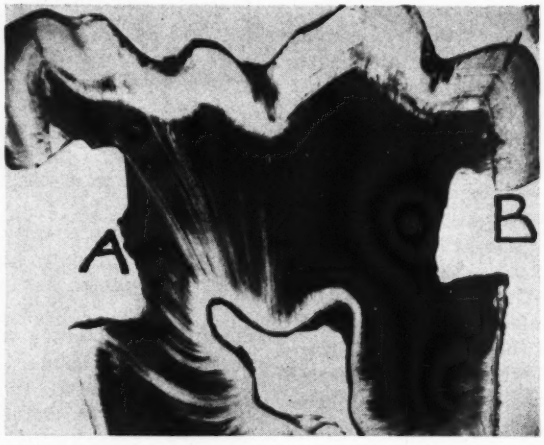

Fig. 3—Photomicrograph of a ground section of a human molar showing (A) carious lesion not treated with sclerosing agent; (B) effect of sclerosing agent on carious zone. Note heavy staining which denotes penetrability of the drug (X 6.8).

[10]Schoenbeck, Fritz: Praktische Wege zur Verhuetung und Bekaempfung der caries, Deutsche Zahn-Mund & Kieferheilkunde, February, 1935.

the apex of the cone toward the pulp. The first zone, nearest the base of the cone, was a deep blue and extended pulpally from 1200 to 1400 microns. The second zone was a light blue staining area of approximately 400 microns. The remainder of the area, as far as the pulpal wall, was darker than the second zone (Figs. 2 and 3).

Comments

The short duration of pain following the tiranal treatment may be explained on the basis of Schroeder's[1] observations that the contraction of the dentine treated with tiranal produces a tension and rupture of the dentinal tubules at these sites. I was unable to observe this phenomenon histologically and further investigations must be made to verify this point.

The fact that pulp tests with faradic current before and after treatment did not show significant variations indicates that tiranal did not irritate or injure the pulp.

Following treatment with tiranal clinically, the dentine became hardened; a change in color was also noted. Schroeder[11] believed that this transformation is due to the changing of the affected dentine from an organic to an inorganic state. The literature does not show a chemical analysis to prove Schroeder's contention, nor have I carried through such chemical analysis. Regardless of this point of view, the hardening, the change in color, and the contraction of the treated dentine indicate that a barrier of defense is formed against further ingress of micro-organisms. Furthermore, an excellent floor is physically produced for subsequent operation incident to cavity preparation.

The histologic staining reactions bear out these statements and they further illustrate the physiologic benefits of tiranal treatment. The staining reactions in the dentine, typified by the three zones, are indicative of the pathologic condition common to carious dentine.

The second zone, which is commonly referred to as sclerotic dentine and which ordinarily appears to be transparent, does not stain so intensely following treatment with tiranal. This natural zone of defense against the progress of caries in dentine stains identically as the normal healthy dentine.

The action of tiranal appears to form an artificial wall of defense. Whereas the natural process involves the throwing up of this line of defense ahead of the invasion, tiranal destroys the carious medium and transforms it into a sclerotic substance, thereby augmenting the second zone in its physiologic function as a zone of defense. In caries profunda, in which this second zone is extremely thinned, the action of tiranal is such that softened overlying carious material, which according to conservative techniques for cavity preparation should be entirely removed, can be left and transformed into an inert protective layer.

I wish to point out that cases to be treated with tiranal should be carefully selected according to the indications for its use. No benefits are attributed to tiranal when exposures of the pulp are already present, when passive hyperemia or inflammation is evident, or when in senile patients the response to stimulation by the production of secondary dentine is minimized. As previously stated, tiranal finds its main place in the treatment of children and young adults.

The use of tiranal is not limited to caries profunda; it may be applied efficiently in shallow cavities as a prophylactic measure. Lehner[4] especially recommends this sclerosing agent in superficial caries, caries of the gingival region, and in cases in which decalcification of the teeth results from orthodontic appliances. The use of this drug as a prophylactic in early pit and fissure decay to prevent further operation and enlargement of the cavity has also been recommended by Lehner.

Conclusions

1. Tiranal, an artificial carious dentine sclerosing agent, has been successfully in use in Europe since 1931.

2. I have conducted a clinical and histologic investigation of fifty-seven cases to evaluate the contentions made for this drug in the European literature.

3. Control tests were made to differentiate the action of tiranal from the natural defense mechanism of sclerosis.

4. The results show that tiranal penetrates carious dentine. It changes the diseased dentine to a hard firm substance, the color of which differs from the decayed dentine.

5. The hardened wall serves as a barrier for defense, augmenting sclerotic dentine and protecting the underlying pulp, especially during subsequent cavity preparation.

6. The indications for the use of tiranal are usually found in young persons in whom pulp exposure is not present and no pulpal disease is evidenced.

7. Tiranal decreases sensitivity concomitant to cavity preparation.

8. Further investigation will involve controlled animal experiments to study the pulpal reactions.

9. After two and a half years of successful clinical application, I can recommend the use of tiranal in caries profunda and superficial caries.

3131 *Lincoln Avenue.*

[11]Schroeder, Hermann: Footnote 1, first reference.

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Construction of a Cast Stress-Breaker

A. H. BASSMAN, D.D.S., Milwaukee

FIXED BRIDGEWORK presents problems of fixability in both large and small cases. Smaller bridges invariably require semifixation, or what is commonly known as stress-breaking. This is nothing new in dentistry. Stress-breakers have been made for years, and there are numerous kinds.

The casting process, so extensively used in dentistry, enables us to make a stress-breaker that resembles a ball and socket. This type of stress-breaker aids the bridge to function physiologically, prevents it from coming apart; does not interfere with the tongue, and is hygienic.

In the construction, for example, of a three-tooth bridge on the upper left side to replace the second bicuspid, two inlay attachments will be necessary: a distal-occlusal on the first bicuspid and a mesial-occlusal-lingual or mesial-occlusal-distal on the first molar.

Technique

1. Regular preparations are required for both attachments. In making the wax pattern on the bicuspid, it is advisable to build the distal surface a little thicker so as to allow for a deeper and wider stress-breaker.

2. The wax patterns are invested and cast in the usual manner.

3. Inlays should be ground smooth-

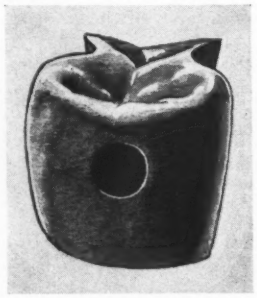

Fig. 1—Round hole made in center of upper two thirds of bicuspid attachment on distal surface as deep as attachment will permit.

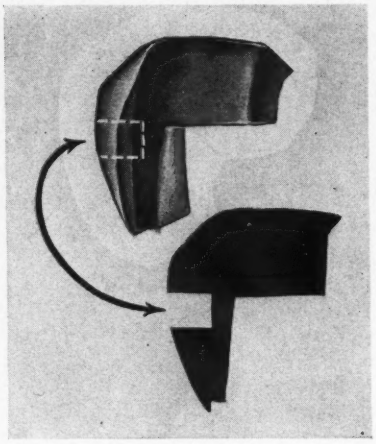

Fig. 2—Cross section of hole shown in Fig. 1.

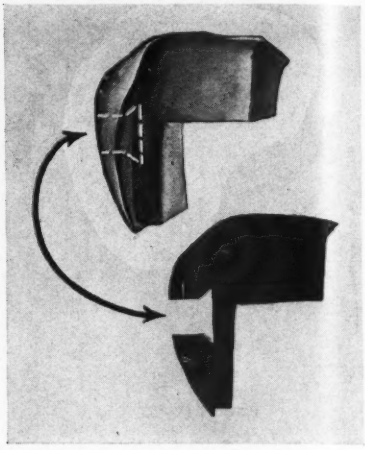

Fig. 3—Undercut in deepest part of hole to complete stress-opening in attachment.

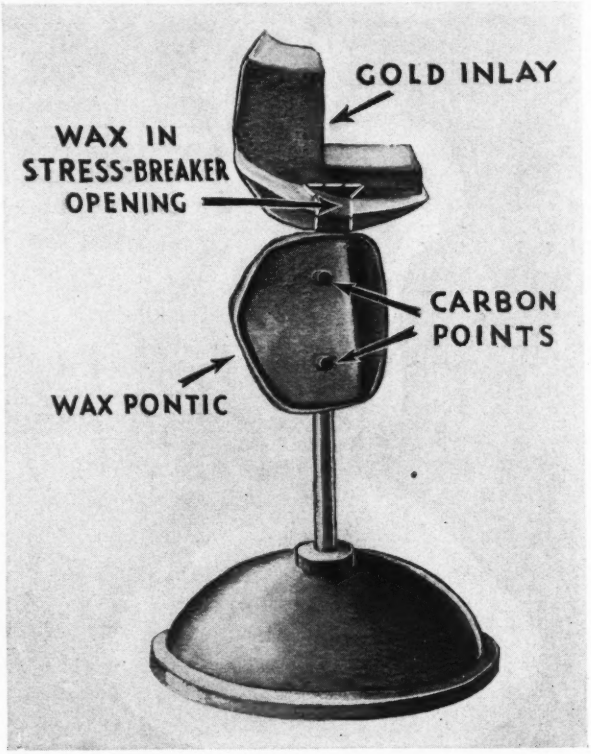

Fig. 4—Attachment and wax pattern of pontic in position and carbon points fitted.

ly and should be anatomically carved.

4. In taking the plaster impressions, the teeth with the attachments in place should be covered with a thin coat of some pleasant oil. This will prevent plaster from adhering to the carving on the occlusal surfaces and, in turn, will allow the seating of attachments into their proper positions.

5. A low-fusing metal model is made which is preferable to a stone or plaster model, because the bicuspid attachment is taken off the model many times.

6. Models are placed in occlusion; the facing is ground, and a porcelain saddle baked.

7. The pontic is waxed and set aside.

8. In the center of the upper two-thirds on the distal surface of the bicuspid attachment a round hole is made beginning with small burs and finishing with a number 60 bur (straight handpiece) as deep as the attachment will permit (Figs. 1 and 2).

9. With the aid of an inverted cone bur (size 38-39), an undercut is established in the deepest part of the hole. This should be done in as circular a manner as possible (Fig. 3). This completes the stress-opening in the attachment.

10. The stress-opening is immediately painted with a medium paint of antiflux and turpentine or a paint of chloroform and rouge. The stress opening is filled with a wax combination, 50 per cent inlay—50 per cent sticky wax.

11. Place the attachment and waxed pontic into position and sear with a small spatula. Temporarily, the bicuspid attachment and wax pontic are one solid unit. This is removed from the model. A sprue is inserted on the distal of the waxed pontic. The facing is removed with the aid of sticky wax, and carbon points are fitted (Fig. 4).

12. Invest and burn out as usual. Allow the mold to cool for two or three minutes before casting. The antiflux in the stress-opening prevents the union of one gold with the other. The undercut prevents the stress-breaker from sliding out. Sufficient movement will be found between the cast pontic and the bicuspid attachment.

13. The casting is boiled in a 50 per cent solution of muriatic acid for five minutes to dissolve the remains of the antiflux.

14. The facing is fitted. This part of the bridge is fitted back on the model and waxed lightly to the molar attachment.

15. A small plaster splint is made on the occlusal surfaces of attachments and pontic. Remove and invest in a fireproof investment. Solder to molar attachment.

Comment

A bridge of this nature is easily handled during cementation. Attachments are easily seated, and abutment teeth do not lose their independent movement.

411 *East Mason Street.*

EXAMINATION FOR APPOINTMENT IN THE DENTAL CORPS, REGULAR ARMY

An examination for the selection of candidates for appointment in the Dental Corps, Regular Army, will be held during the period February 13-18, 1939.

The examination, which will include both physical and professional examinations, the latter consisting of written, oral and clinical tests, is open to male citizens of the United States between the ages of 22-6/12 and 31-9/12 years at the time of the examination who are graduates of acceptable dental schools and who have had at least 1-11/12 years subsequent practice in their profession.

Full information and application blanks will be furnished upon request to The Adjutant General, War Department, Washington, D. C. Applications will not be considered after January 31, 1939.

Oil Bath Technique for Thermoplastic Dentures

C. FRANK TUMA, D.D.S., Cleveland

Advantages

The oil bath technique for thermoplastic dentures has the following advantages:

1. It requires little additional equipment.

2. It is applicable to any thermoplastic material, such as the pyroxylin, the vinyl resin, the metastyrene, or the acrylic resin types.

3. It is simple and time-saving, accurate and safe.

4. It results in a denser and less porous case, superior to one that has been dry-pressed. Internal strains due to uneven heating are eliminated.

Equipment

1. Any large accurate-fitting flask with long guide lugs may be used. A shallow lower section with waste-gate openings is preferred.

2. A sturdy flask press is needed. The bench plate should be mounted in a shallow tin pie-plate to catch the draining oil.

3. A heavy, deep kettle large enough to receive the flask press should be at hand.

4. Common motor oil (SAE 50-60), Diesel turbine engine oil, medium or heavy, or heavy mineral oil may be used, repeatedly.

5. Any thermometer registering up to 300° F., such as a candy or deep-fat frying thermometer, may be used.

6. Ejector parts are necessary, consisting of (a) a semicircular pad of one-fourth inch thick shoe leather, with the diameter about 3 inches, and shaped like the interior of the flask; (b) three spacer strips of soft metal one-fourth inch square and from 1 to 2 inches long. Aluminum is excellent for this purpose.

Technique

Flasking (Fig. 1)—1. Burnish over the entire base of the cast with thin tin foil to facilitate removal of the base from the flask after pressing has been completed.

2. Use quick-setting stone for the cast and for flasking the first half. Before the flasking stone has completely set, gouge out a five-sixteenth inch channel all around the periphery of the case and adjacent to the edge of the flask. This will provide a waste channel for excess material.

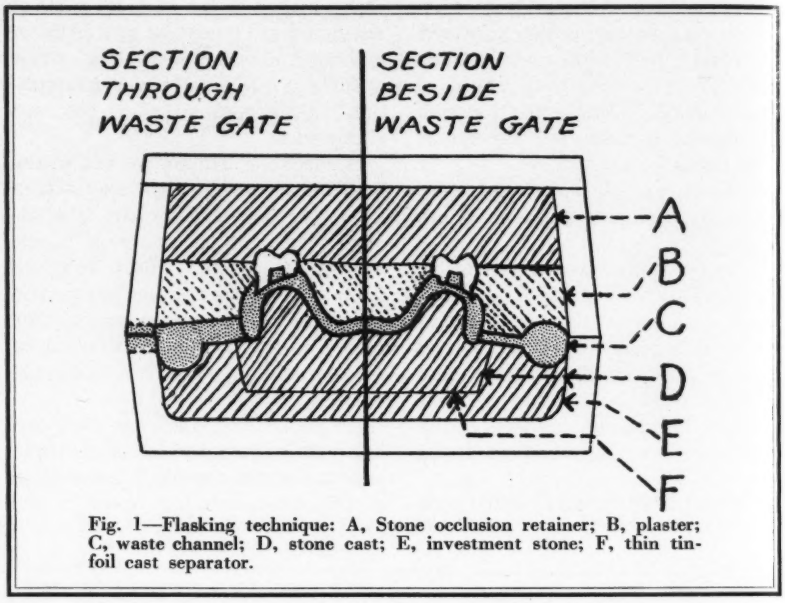

Fig. 1—Flasking technique: A, Stone occlusion retainer; B, plaster; C, waste channel; D, stone cast; E, investment stone; F, thin tinfoil cast separator.

3. Wax a strip of base-plate wax around the entire periphery of the waxed denture pattern, completely bridging the gap to the waste channel.

4. Completely fill the waste channel with a roll of wax about the size of the diameter of a pencil.

5. Wax the waste-gate sprues, like spokes of a wheel, from five or six evenly spaced points on the periphery of the waxed denture pattern to the waste-gates in the flask, or to the wax-filled waste channel. If the flask has no waste-gate openings, be sure that the waste channel will more than contain the entire excess blank material.

6. These provisions for free escape of the excess blank material eliminate the need for extreme pressure in closing the flask and also eliminate the formation of wrinkles or folds in the material around the periphery.

7. Before flasking the second half of the case, no separating medium need be applied because all the plaster in the first half is covered with wax.

8. Place the second half of the flask in position and fill with ordinary flasking plaster only to the level of the incisal third of the teeth. Do not cover the occlusal or incisal surfaces.

9. Allow to set and apply a separating medium. A saturated solution of paraffin in benzine is excellent.

10. Complete the flasking of the second half with quick-setting stone. This acts to maintain the occlusion without opening the bite.

11. The flask must be accurately closed.

12. Allow to set at least one hour.

Eliminating Wax and Moisture—1. Immerse the flask in hot oil (about 250° F.) in the kettle for five or six minutes.

2. Open the flask; remove the wax and the shellac trial baseplate.

3. Flush out with hot oil if necessary.

4. For materials, such as the vinyl resins, or metastyrene bases, requiring complete elimination of moisture

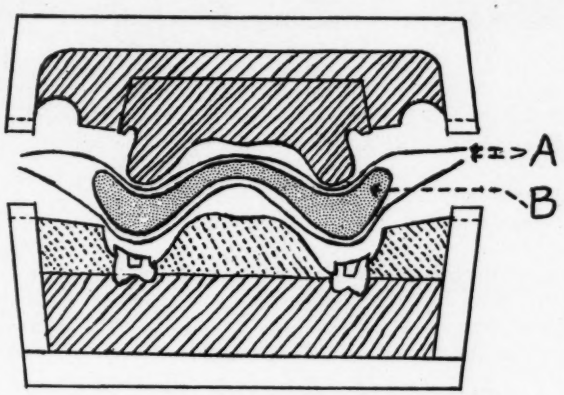

Fig. 2—Assemblage for pressing: A, Cellophane; B, blank.

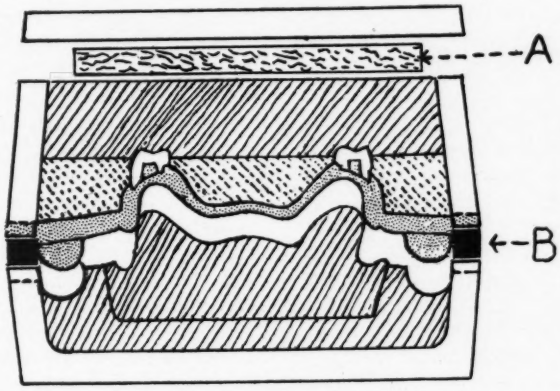

Fig. 3—Ejecting case from flask: A, Leather ejector pad; B, ejector spacer strip (soft metal).

from the flask, boiling in hot oil from twenty to thirty minutes results in a completely dry case. Profuse foaming indicates the elimination of water. When the foaming stops the moisture is eliminated. Pyroxylin cases need be boiled only from five to ten minutes. Use a kettle large enough to avoid boiling over the rim.

Assemblage for Pressing (Fig. 2)—1. Place second half of flask with teeth down.

2. Stretch over this a sheet of ordinary cellophane. Some of this cellophane will be permanently pressed into and around the teeth without harm. It will provide a smooth finish for the palatal, buccal and labial surfaces.

3. Lay the blank in position.

4. Cover with a sheet of *thin* cellophane to provide a smooth tissue surface.

5. Place the cast half of the flask in position.

6. Assemble flask in press. Use little pressure at this time.

Pressing the Case—1. Immerse in hot oil at about 250° F. and allow the blank to soften for five minutes before closure is begun. Be guided by instructions accompanying blank for maximum temperature. Most pyroxylin bases will be found to tolerate temperatures up to 290° F. for brief periods after the flask is nearly closed.

2. Slowly close the flask, apply light pressure every minute or two at the start, and gradually increase the pressure used. Take twenty or twenty-five minutes to complete the closure. At extreme temperatures take only fifteen or twenty minutes for closure.

3. As soon as the flask is completely closed, it should be immersed in cold water. When completely cold, the clamp may be removed, and not before.

Ejecting Case from Flask (Fig. 3)—1. Pry apart the two halves of the flask and insert at two or three points around the edge of the flask, one-fourth inch square strips of aluminum or other soft metal.

2. Remove the cover of the flask and place the semicircular piece of one-fourth inch shoe sole-leather against the plaster flask contents and lay the cover over this.

3. Reinsert in flask. Press and push contents out of the flask.

4. The investing stone and plaster can be easily broken away from the case with the fingers. Be careful to prevent leverage against the anterior teeth which break easily.

Finishing the Case—1. Saw off the excess.

2. Polish in the usual manner, avoiding over-heating from *dry* rag or brush wheels.

3. Coat with vaseline or mineral oil and immerse in water until delivered to patient. Instruct patient to keep denture immersed in water when not in the mouth.

Rebasing of Thermoplastic Dentures—1. The new impression is taken in the old denture, preferably with wax. Ordinary paraffin, paraffin and beeswax (equal parts of each), or carding wax may be used. It is melted and painted on with a brush, and adjusted in the mouth.

2. The denture is flasked as a new case.

3. Separation is accomplished by immersing the flask for eight or ten minutes in oil at from 280° to 300° F.

4. The flask is pried open and the old blank removed with a pair of pliers while it is still hot and flexible. Any dislodged teeth must be carefully replaced.

5. The case is now pressed with a new blank and finished as usual.

13201 *Miles Avenue.*

Stabilizing Full Lower Dentures

JACOB H. GREENBERG, D.D.S., Buffalo

THE TECHNIQUE TO be presented is based on the prosthetic research of Doctors E. Wilfred Fish of London, and Fournet, Tuller, and Ante.

In order to understand the theory involved in this technique, one should be familiar with the origin, insertion, and action of the muscles forming the boundaries of the denture; especially the buccinator, constrictor pharyngis superior, mylohyoid, triangularis, and the mentalis muscles.

At the first appointment, the digital examination should be made and the tissues carefully surveyed so that the operator may know the limitations and note the hard spots, blunt or sharp bony ridges, unusual projections, abnormal projections, and the shape of the external oblique line. The mylohyoid muscular attachment is frequently merely a line of thin fibers, but sometimes its attachment becomes as much as a fourth of an inch thick in the bicuspid and molar area. After all deformities or abnormalities are corrected, the following procedure is employed:

Technique

1. A suitable tray is selected from either a set of Fournet-Tuller trays or S. S. White trays, numbers 101, 103 or 105. This tray must be long and wide, because the preliminary impression must include all the tissues of the mandible and extend high enough on the ramus to include and extend at least 5 mm. beyond the "pear-shaped body" on the face of the ramus of the mandible. The impression is taken with a high-fusing compound.

2. The tray is filled with an excess of material; inserted in the mouth sideways and centered. With the thumbs in the mouth and the fingers under the chin, press firmly to place downward and backward, the anterior first, then the heels.

3. With the fingers, manipulate the compound at the posterior buccal and lingual flanges.

4. While the compound is still soft, have the patient extrude the tongue and move it as in the motion of moistening the upper lip. This action gives the operator a fair idea of the lingual extension of the denture without too much over-extension.

5. Do not chill but remove by pressing upward and backward. Be sure to apply cold cream to the patient's lips.

This impression should show a well-defined external oblique ridge, the forward face of the ramus, the pear-shaped papilla, and the mylohyoid ridge.

6. Remove all undercuts and pour a model.

7. *Preparation of Tray*—In preparing the tray, vulcanite as advocated by Doctor Tuller or base-plate material as used by Doctor Ante may be used. The choice of vulcanite or base-plate material depends on the condition in the mouth and the care and time which the operator wishes to devote to the case. I find vulcanite excellent as a tray, and although I have tried base-plate materials, I have found this technique unsatisfactory. With a pencil draw the outline for the vulcanite tray on the cast, this outline should extend to the muscle attachments on the labial and buccal, to the floor of the mouth on the lingual, and on the distal buccal to the external oblique ridge. Finish the vulcanite tray to this outline and be sure to have a handle on the tray.

8. *Trimming and Fitting Tray*—This step in the impression taking cannot be over-emphasized. The more time taken for the fitting and the more accurate the outline, the more satisfactory will be the end-result.

(a) Starting from the disto-buccal, the periphery should terminate even with or slightly over the external oblique ridge.

(b) Along the labial and buccal margins, trim the tray to the muscle zero line. "The Zero Line is an irregular imaginary line," says Doctor Tuller, "where the edge of the denture must lie to secure atmospheric seal without irritation, disturbed nutrition, altered speech and without discomfort. Also the flexion of the muscles must be insufficient to disturb the denture." The muscles involved here are the mentalis, at the symphysis, the quadratus labii inferioris, triangularis and the buccinator.

(c) The upper posterior border of the tray should extend well above the pear-shaped body at least 5 mm. upon the ramus. This assures horizontal stability.

(d) In trimming the lingual, be patient and exacting to the finest detail. Starting with the posterior lingual, trim the distal border, covering not more than three fourths of an inch at a time by having the patient force the tongue straight out, and trim until only a slight lifting is perceptible to the fingers. This determines the distal length of the tray, as it rests in the superior constrictor pouch at the imaginary zero line. If the finger is placed on the edge of the posterior lingual rest when the tray is in the mouth, it will appear that the tray is sticking out into the throat, but this is only because the patient has pulled his tongue back and the superior constrictor muscle has been drawn away from the edge of the tray.

(e) Next, by placing the tongue first in the left cheek, then in the right, the periphery in the molar and second bicuspid area is trimmed until the tray does not lift noticeably.

Fig. 1—Preliminary compound impression (inner surface).

Fig. 2—Plaster cast with outline for vulcanite tray.

Fig. 3—Tissue surface aspect of finished tray ready for trimming in the mouth.

Fig. 4—Disto-lingual flanges. Tongue movement for trimming posterior lingual length of tray, and final impression. Tongue extruded from mouth. Note marks between which trimming is done in this position.

Figs. 5 and 6—Molar area. Tongue positions for trimming lingual length of tray in molar area. Fig. 5: Tongue in left cheek. Fig. 6: Tongue in right cheek. Note markings of approximate areas.

Fig. 7—Tongue positions for bicuspid area. Tongue in palate to illustrate position for trimming lingual length of tray in bicuspid and cuspid area.

Fig. 8—Frenum position for trimming tray for lingual frenum.


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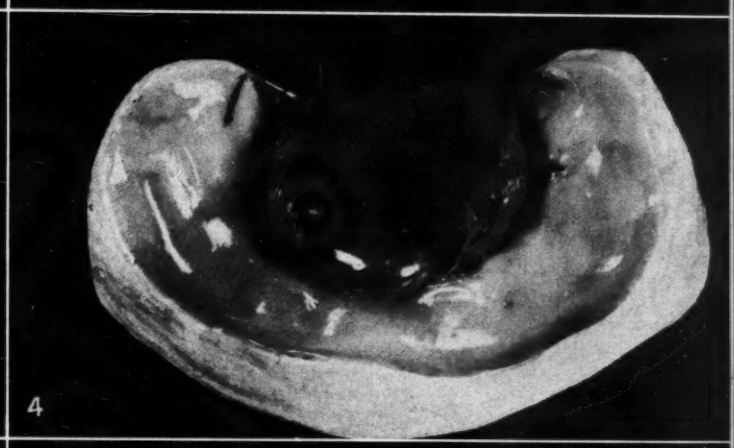
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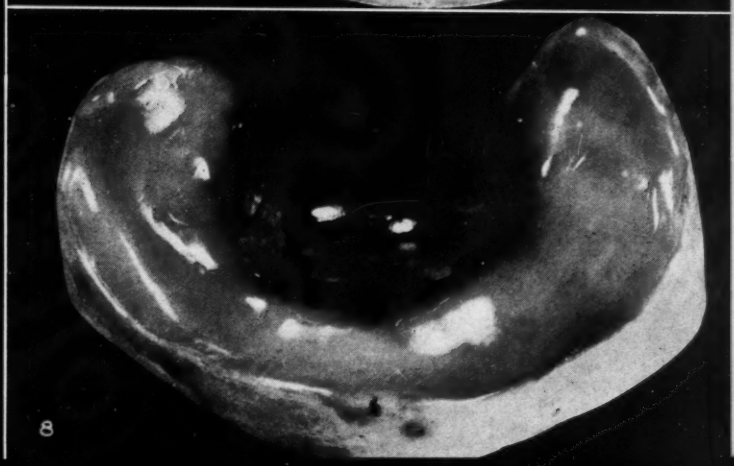
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Figs. 9 and 10—Tray trimmed and wax placed ready for impression. Fig. 9: Top outside view, showing tissue surface and ridge of wax before impression is taken. Fig. 10: Inside or bottom view.
Figs. 11 and 12—Completed impression, two views. Fig. 11: Top or outside view. Fig. 12: Bottom or inside view.
Fig. 13—Finished cast. Note definite finishing line.
Fig. 14—Zero line compressible area. Schematic model showing imaginary zero line. Floor of model is made of sponge rubber which has almost the same resistance as the tissues of the mouth. Zero line is difficult to illustrate but is used to explain that compression can and may be excessive in this area without being noticed until the patient begins to use the muscles. The denture must just touch this line and not over-compress it; otherwise, soreness is sure to follow.

(f) The bicuspid and cuspid areas are checked by placing the tongue to the roof of the mouth.

(g) Next, by moving the tongue to the corners of the mouth, as in moistening the lips, the lingual frenum is checked so that the tray does not impinge.

(h) The trimming is repeated until the patient can place the tongue in either cheek, to the roof of the mouth, to the lips, and even open the mouth wide without any perceptible rise in the tray. The periphery must end at the soft tissue seal with only the slightest pressure. If the tray has suction, there will be over-extension and further trimming must be done. Only horizontal stability is expected to be positive.

9. *Final Impression*—Kerr's plastic wax is used in this step.

(a) Dry the tray, and with a hot spatula, flow a thin film of melted wax over the entire inside of the tray.

(b) Then place strips of Kerr's plastic wax, about 5 mm. in width, around the entire peripheral border, pressing the wax over the external borders to an even thickness. Do not extend the wax on the crest of the ridge. Do not use too much wax.

(c) Soften the wax either by placing it in warm water or over a Bunsen burner, being sure not to melt the wax.

(d) Insert in the mouth and, using the thumbs, press to place with a downward and backward pressure. Plenty of time should be taken here.

(e) Muscle-mold the buccal and labial borders, using light pressure with the fingers and being sure that all muscle attachments have been freed. Too much impingement will result in soreness, and the denture will bob upward. It is easier to mold wax than to trim vulcanite in the finished denture and much more accurate.

(f) Have the patient go through the tongue movements, as shown on models in the accompanying illustrations, while the impression is held firmly in the mouth. This gives accurate seal of the finished denture to the mylohyoid muscles and the superior constrictor which forms the posterior lingual seal in the denture. The final motion is to suck and swallow. This brings all the muscles into action and if all the other steps were carefully taken, the impression should have definite stability.

(g) Chill the impression thoroughly before removing. The easiest way to remove the impression is to break the seal by grasping the lower lip and giving it a downward and outward pull.

(h) If stability is lost in the impression, add wax where needed and repeat.

The impression should have a thin layer of wax over the entire inner surface of the tray; it should have rounded borders, and should be entirely smooth. If the wax is wrinkled or lumpy, it has not been handled correctly or an insufficient quantity was used. Wax can be added in any amount by placing it at the periphery of the tray and letting it find its own way to fill the gaps.

10. *Stone Model*—Pour a stone model, preserving the rolled margins of the impression as recorded in the wax. See to it that the laboratory only polishes these surfaces lightly, for sandacones or arbor bands must never be used in trimming the periphery of the denture.

11. *Finishing*—The finished denture should be relieved along the mylohyoid ridge with a number 10 round bur, especially if the membrane is thin over that area. The finished denture must have a rounded, thick and highly polished periphery, particularly so at the disto-buccal border. The disto-buccal flange, which has never been present on lower dentures before should be dished out and thinned down on the upper side, except for the border, to provide for the thickening of the buccinator muscle when it contracts in mastication. Keep in mind that this flange lies beneath the belly of the buccinator, in the space known as the buccal fold and this space is not roomy.

Care and diligence together with an understanding of the underlying principles of the technique will guarantee stabilized full lower dentures.

490 *Grant Street.*

Announcement of Books Received

DENTAL MATERIA MEDICA AND THERAPEUTICS (With Special Reference to the Rational Application of Remedial Measures to Dental Diseases), By Hermann Prinz, A.M., D.D.S., M.D., Sc.D., Dr. med. dent.; and U. Garfield Rickert, A.M., D.D.S. Seventh edition, enlarged and revised, according to the United States Pharmacopeia, Eleventh Decennial Revision; St. Louis, The C. V. Mosby Company, 1938.

A TEXTBOOK OF MEDICINE By American Authors, Edited by Russell L. Cecil, A.B., M.D., Sc.D.; Associate Editor for Diseases of the Nervous System, Foster Kennedy, M.D. Fourth edition, revised and entirely reset; Philadelphia and London, W. B. Saunders Company, 1938.

DENTAL SCIENCE AND DENTAL ART (Illustrated), Edited by Samuel M. Gordon, Ph.D., Philadelphia, Lea & Febiger, 1938.

A Porcelain Technique for the General Practitioner

STERLING T. BOWEN, D.D.S., Los Angeles

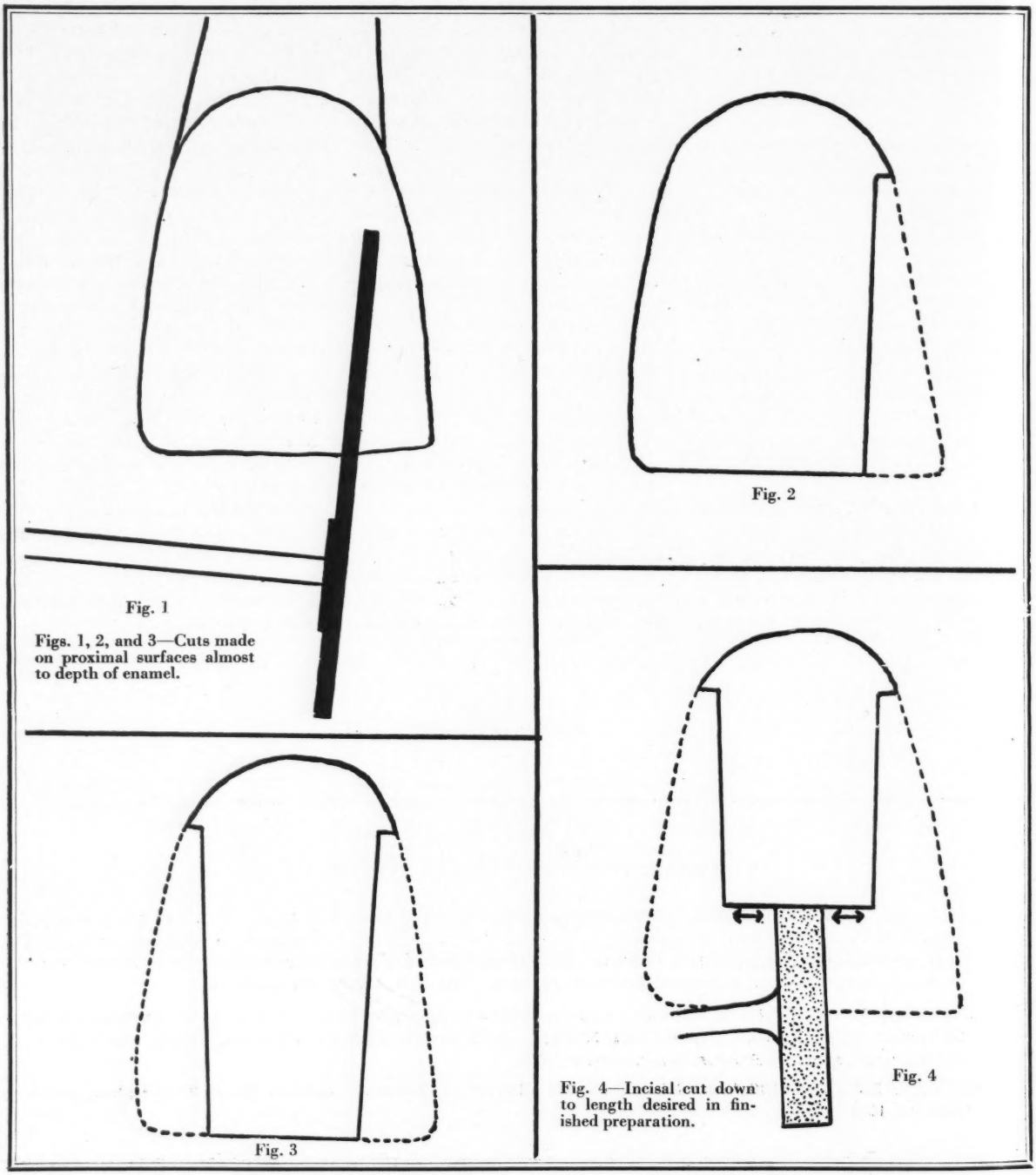

Fig. 1

Figs. 1, 2, and 3—Cuts made on proximal surfaces almost to depth of enamel.

Fig. 2

Fig. 3

Fig. 4—Incisal cut down to length desired in finished preparation.

Fig. 4

THE METHOD OF PREPARATION advanced here is meant primarily for the general practitioner and has been carried out in several hundred practical cases with gratifying results. The ease of this method will usually reduce the preparation time, and will result in a perfectly-fitting porcelain crown

Technique

1. With a joe dandy disk, the first cut is made on the proximal surface almost to the depth of the enamel on that side. Similar cuts are made on both proximal surfaces (Figs. 1, 2, and 3).

2. Select as large a heatless stone as can be used on the particular tooth and cut the incisal down to the length desired in the finished preparation (Fig. 4).

3. At this point the shoulder on the proximal surfaces has already been roughly prepared, and the shoulder preparation is begun on the labial and lingual. A wheel bur is used for this cut which may be purchased in various sizes. The advantage is that because of the small size of the bur the labio-proximal and linguo-proximal angles may be reached and a good shoulder obtained at this point. As the bur is sunk to the shaft, the result is a shoulder with the same depth all around. It has been my experience that it is this point which causes many jacket failures. Techniques employing stones for the shoulder rarely can reach the angles satisfactorily (Fig. 5).

4. The large stone is used again to remove the enamel on the labial and lingual surfaces (Fig. 6).

5. In smoothing the preparation and finishing it, a cross-cut tapering fissure bur is used rather than stones. Two purposes are accomplished: The flat end on the bur helps to square the

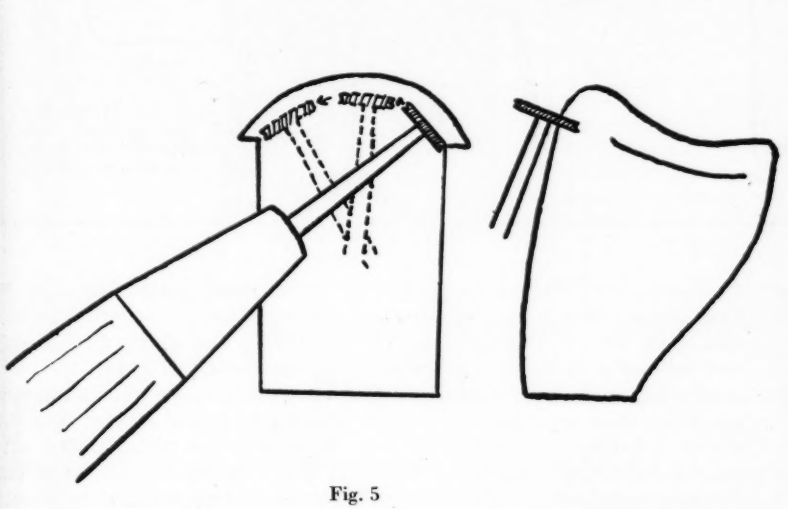

Fig. 5

Fig. 6

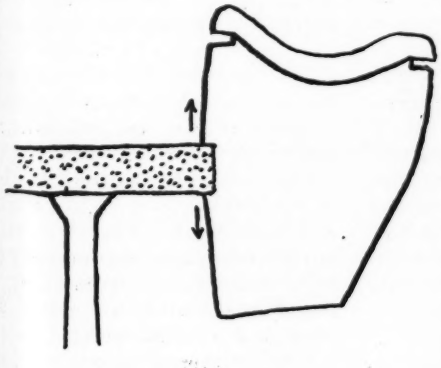

Fig. 7

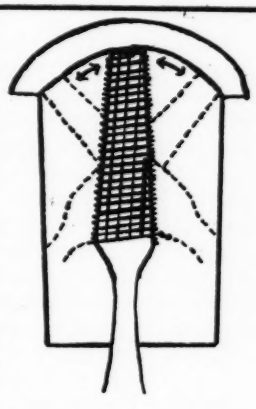

Fig. 8

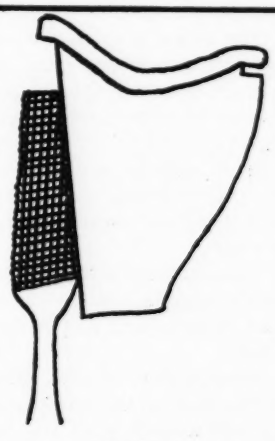

Fig. 9

Fig. 5—Shoulder at labio-proximal and linguo-proximal angles is the same depth all around.
Fig. 6—Enamel removed with large stone on labial and lingual surfaces.
Fig. 7—Stone is used to reduce labial contour.
Figs. 8 and 9—Cross-cut tapering fissure bur is used to smooth and finish crown preparation without undercuts. Shoulder is thus squared.

Fig. 10

Fig. 10—Labial shoulder carried up under free margin of gums, and smoothed all around tooth with an end-cutting fissure bur.

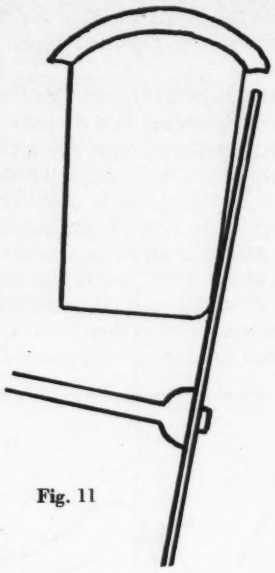

Fig. 11

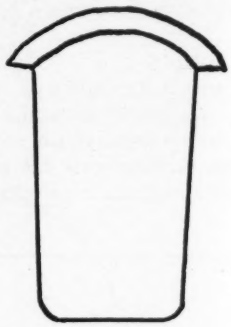

Fig. 12

Figs. 11 and 12—Preparation smoothed and finished with sandpaper disks. Definite shoulder and no undercuts should result.

shoulder, and the cutting surface of the bur smoothes and finishes the crown preparation, preventing undercuts (Figs. 8 and 9).

6. Carry the labial shoulder up under the free margin of the gums and smooth the shoulder all the way around the tooth with an end-cutting fissure bur. If the operator desires, he may also use a chisel to smooth the shoulder (Fig. 10).

7. The crown is smoothed and finished with sandpaper disks. A good preparation with a definite shoulder and no undercuts should result (Figs. 11 and 12).

8. This step is controversial, but under practical conditions, I have obtained the best results using this technique:

a) Adapt a band to the preparation, fitting it as closely as possible and allowing it to extend just beyond the shoulder.

b) Place a piece of oiled cardboard over the end of the band and melt inlay wax into it until the band is full.

c) The filled band is then pushed firmly over the preparation and held in position until it is completely chilled with ice water.

Wax used in this manner will take a much more accurate impression than compound will. By melting the wax rather than just softening it, the position of the molecules in the mass is changed completely rather than being distorted; thus the tendency to distort and return to the original position is eliminated. If care is taken this impression will be a perfect negative reproduction of the prepared tooth (Fig. 13).

9. In running the amalgam die, care must naturally be taken because of the wax impression. Two different methods may be used: The amalgam may be centrifuged into the impression in the same manner in which kryptex dies are made; or the impression may be set in plaster after boxing-in, and after the plaster has set, the amalgam may be vibrated into the impression. After the wax impression is filled, it may be condensed by pressure.

Baking Technique

For those who desire to make their own jackets, I have devised a simple method of baking which requires no large outlay for materials and no special training in blending shades. After the die and models are run up and the case mounted, these steps are taken:

1. A shade having already been taken, a facing is ordered of the approximate size and shape of the tooth to be jacketed (Fig. 14).

2. A platinum matrix is adapted and the facing hollow-ground until it fits down over the die with the correct labial bulge and contour. A mixture of porcelain of approximately the shade of the tooth is vibrated around the entire shoulder and under and against the facing. (Three or four average shades are all that will be necessary to keep on hand.) The facing is held in place by sticky wax on the collar of the platinum. The wax will burn off in the oven and the first bake will fuse to the porcelain facing.

3. In the second bake the entire bulk of the tooth is built up in porcelain and fused (Fig. 16). The jacket is then ground into shape and contact, finished down around the shoulder, replaced in the oven, and glazed. The result is a finished jacket.

4. When several jackets are to be made in the same mouth the exact shade may be duplicated on all. With a little judicious use of low-fusing stains, almost any desired effect may be obtained.

5514 *Wilshire Boulevard.*

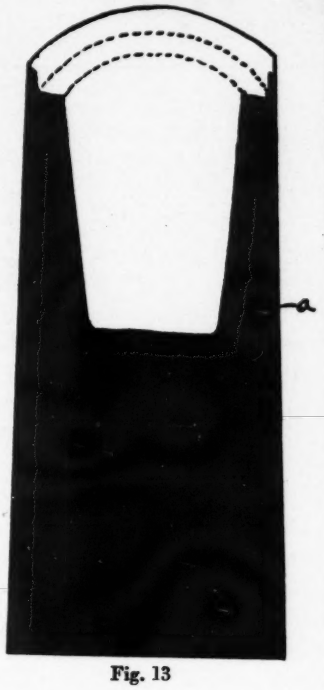

Fig. 13

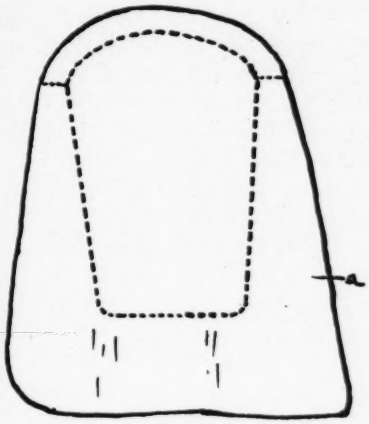

Fig. 14

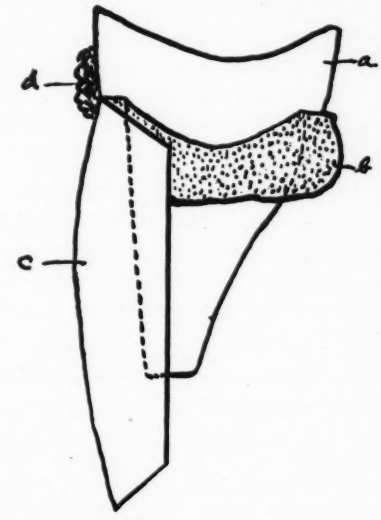

Fig. 15

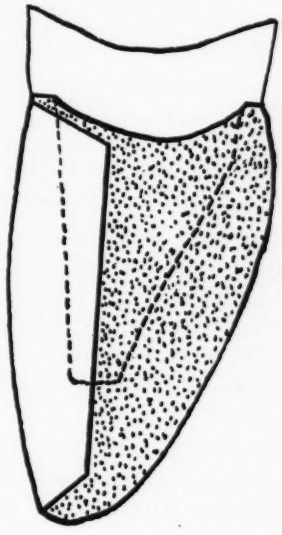

Fig. 16

Fig. 13—Impression is a negative reproduction of prepared tooth.
Fig. 14—Facing of approximate size and shape of tooth to be jacketed; a, represents the tooth.
Fig. 15—Facing held in place by sticky wax on collar of platinum; a, platinum; b, porcelain; c, facing; d, sticky wax.
Fig. 16—Entire bulk of tooth built up in porcelain and fused in second bake.

The Editor's Page

PRESENT MEDICAL practice depends on serologic and chemical tests to prove the existence of disease. The Kahn, Widal, and tuberculin tests, for example, are diagnostic for syphilis, typhoid fever, and tuberculosis. Dental caries, however, does not simulate any other disease. The type of tissue destruction known as tooth decay cannot be confused with any other lesion. The evidence of disease is objective. We can see and we can feel the cavity caused by the disease. It would be advantageous if there were tests to indicate the potential caries susceptibility; if we could tell specifically whether a person was about to enter into an acute episode of caries; whether the disease was arrested; or whether a person was about to enter an arrested state. We know that tooth decay like other diseases has its ups and downs of recurrence and remission following the surges of metabolism.

Recently, three investigators presented a round table symposium on diagnostic tests to determine caries susceptibility. Each approached the subject differently. Fosdick of Northwestern University describes the test that they use in the dental clinic of that school which is a chemical test and gives the degree of susceptibility as shown by the amount of tooth calcium that goes into solution in incubated saliva. The more calcium that is absorbed in the saliva, the more susceptible the person is, according to this test. On the other hand, the more resistant human enamel is to dissolution in saliva, the more immune the person is to tooth decay.

Blayney of the Zoeller Memorial Clinic uses bacteriologic tests to determine the degree of susceptibility on particular surfaces of the teeth. By the number of organisms demonstrated from a particular tooth surface, Blayney is able to determine the susceptibility of that surface. In clinical dentistry, it would often be well to know exactly what susceptibility a particular surface of a tooth possessed. The therapy might thereby be greatly changed.

Kesel at the University of Illinois uses a bacteriologic test in which from samples of saliva, he demonstrates the number of aciduric bacteria per cubic centimeter of saliva. Aciduric bacteria are those that complete the life cycle in an acid medium. These are distinguished from acidogenic bacteria which produce acid. Kesel shows that the number of bacteria per cubic centimeter varies for each person from day to day, probably influenced by the food intake. He insists, therefore, that at least three analyses be made before giving an opinion regarding the degree of susceptibility. Kesel is of the opinion that *Lactobacillus acidophilus* is the bacterial agent that produces tooth decay.

Dentists engaged in clinical practice are not particularly interested in chemical or bacteriologic tests that do not have some application to therapy. These tests, if applied in practice, at the present time at least, would require rather extensive and expensive equipment. The average dentist is neither prepared to do chemical analyses nor to make complicated bacteriologic examinations in his office. There are no commercial laboratories now available for this work.

None of the persons in this symposium indicated what the specific factors are that exist in one mouth which make it possible for aciduric organisms to flourish. It apparently is something associated with carbohydrate débris in the mouth.

No one of these tests reveals the specific factors in dental caries. At present, they indicate the state of potential caries and may act as indexes of the future carious state. It would be advantageous to us, of course, to be able to tell the parent of an adolescent child, for example, that the caries at any particular moment and time either was arrested or was becoming progressively worse. Such knowledge would be of practical value to us in outlining treatment.

We have a long way to go in the treatment and prevention of dental disease, but the development of these bacteriologic and chemical tests foreshadows the direction in which we are moving.

(*Please use coupon on page* 495)

NOTES ON THE

Cuff

September 27: Picture a group of physicians sitting around a table, holding a staff meeting. The subject under discussion is anesthesia. The participants are of the anesthesia staff of the Wisconsin General Hospital. Premedication, thyroidectomy, respiratory obstructions, cardiac arrest, acidotic respiration, and opiate depression—all these subjects, they discuss at length and in detail. Then, the chairman asks the critic of the day to speak, and Carl C. Pfeiffer, M.D., refreshingly forthright and word conscious, tells the staff members that:

"Dr. Leigh said, 'the anesthetic was commenced,' whereas he probably meant to say, 'the anesthetic agent was administered.'

"Dr. Slocum said, 'your oxygen want is best treated by,' and Dr. Waters countered immediately with, 'your increase in blood pressure.' This familiarity with oxygen and blood pressure is probably justified except that in some cases it becomes ridiculous; as for instance the statement which might occur, 'your bad breath in gangrene of the lung.' or 'your 4-plus Wasserman reaction in syphilis.'

"Dr. Hathaway said, 'the patient had his preoperative findings of,' whereas the preoperative findings belonged to the patient and it would have saved time to have said, 'the patient's preoperative findings were. [And, Doctor Pfeiffer, it would have been more accurate to have substituted *conditions* for *findings*, and a greater improvement would have been to say, "the preoperative observations were"—E. J. R.] Dr. Hathaway also said, 'cardiovascular action had ceased.' This is probably his introduction of a portmanteau word to indicate that both the apex beat and the pulse at the wrist were no longer palpable. This may be, if he really means this, a valuable addition to our vocabulary.

"Dr. Bennett must have smoke-sensitive eyes for he kept them closed for a full 10 or 15 minutes, to the point of muscular relaxation, when his charts fell on the floor and he awakened.

"Dr. Slocum said, 'an airway was placed in the patient's throat.' This is suggestive of slipping an aspirin tablet into the patient's throat. If he had said, ' a pharyngeal airway was inserted,' he would have conveyed the idea much more concisely. He also used the expression, 'the pulse rate increased 20 points, the blood pressure rose 20 points, and respiration increased 10 points.' Whereas it is true that our charts have nothing but points on them, in discussion, it would be better to use 'millimeters of mercury' or 'rate.'

"Dr. Waters said, 'respirations did not start for some time.' I doubt the need for the plural subject in this case."

The full account from which these excerpts were taken may be found in the September-October issue of *Current Researches in Anesthesia & Analgesia*. Criticisms of this kind are bound to stimulate intelligent debate. Most of the discussers we hear at dental societies are so busy giving a private lecture of their own with no relationship to the subject under discussion or they are so ponderous with their learned references or so saccharine in their flattery that their discussions are entirely valueless. Soft soap is chiefly lye, and has no place in scientific discussions.

October 1: Months ago he broke the crown in a lower bicuspid, well below the gum line. His untreated caries had been of long standing. Then one day he began to take on acute adiposity in the lower right face. His unilateral swelling was observed by his dental colleagues. Ordinarily they would have given a curbstone opinion that the person was suffering from

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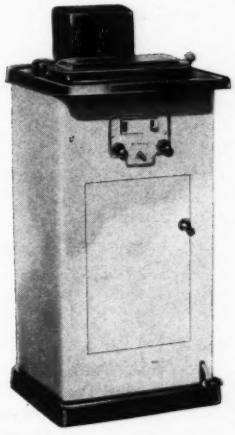

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acute alveolar abscess. But the man was himself a dentist. Then one Saturday night a growling and a grumbling and a creeping began in this unilateral mass, and this Spartan dentist sought his own ministrations. In the left hand, he held a mirror, and in the right, a scalpel. He was about to commit oral harakiri. Out of the depths rolled malodorous pus. "Some day," he said, "when I get around to it, I will have the tooth extracted." Then, he left town, and the rumbling began again. This time, he sought an oral surgeon in the hope that he would not be recognized as a dentist. The surgeon shook his head. He feared osteomyelitis was beginning. My dentist-friend, the patient, says that some day he will have a bridge made; that is, when he has the root removed. If anyone knows a new and miraculous treatment for grave root end disease, please write to Raymond E. Worsley, D.D.S., Dixon, Illinois.

October 3: The medical literature has been full of case reports on the use of sulfanilamide. Some time ago we published a complete report by Howard Raper and J. G. Manser on the use of this drug in severe dental infections. Now a dentist of the Veterans' Administration Facility, William Dickson Lanier, has used this drug in more than one hundred cases. His results are published in the July, 1938 issue of *The Medical Bulletin of the Veterans' Administration*. He says in part:

"Sulfanilamide is indicated in many oral infections, but should never be given without the advice and cooperation of a physician. The local use is without toxic manifestations and may be employed in many conditions without fear of complications. During the past 6 months we have used this chemical routinely in all infections except Vincent's stomatitis, with results as dramatic as those reported in the medical journals.

"In the out-patient clinic, over a period of about 6 months, we have treated with sulfanilamide more than 100 cases where teeth were extracted for far advanced pyorrhea, one-half of a 5-grain tablet being used in each socket. The same treatment was followed in the extraction of more than 250 cases of chronic peri-apical infection. Smears taken from these sockets at the time of extraction showed many cocci present, while smears taken 24 to 48 hours following

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treatment with sulfanilamide showed only a few organisms and, after 3 days, no bacteria present.

"In these cases there was a marked decrease in the usual after extraction soreness, no pain, and no dry sockets.

"Local application in the treatment of Vincent's stomatitis were of no avail. The dye does not penetrate the mucous membrane as does the arsenical preparations, chromic acid, etc.

"The chemical action of the drug when applied locally is not known, but no ill effects in more than 900 cases have been observed. Reports from numerous sources show that continued treatment with large doses has caused marked blood changes, while smaller doses can be given over a period of a week with no ill effects.

"By further study a combination of local and systemic treatment in cases of oral infection may be advantageous.

October 4: Speaking before the Kenwood-Hyde Park Branch of the Chicago Dental Society, someone asks the question, "When the national administration changes, will the agitation for the National Health Program be lessened?" The answer, to be sure, is anyone's guess. Several events, however, should be kept in mind. First, that the background of study for the National Health Conference was built by the Committee on the Costs of Medical Care in 1932, which, in turn, reported during the administration of Mr. Hoover, and at that time, favored "groups of people buying medical care and paying for it over periods of time." The Committee on the Costs of Medical Care was created during the administration of the cautious Mr. Coolidge. In the elections of 1936, the opponents of Mr. Roosevelt made a great issue of the Social Security Act. They said that it was ill-conceived, poorly administered, and that all the people who had Social Security numbers would have to wear them like dog collars around their necks. It appeared that every time people spoke against the Social Security Act, Mr. Roosevelt gained votes. The present Republican National Committee has accepted virtually all the implications of a National Health Program. The quick turn-about-face of the American Medical Association in accepting four out of five of the recommendations of the National Health Confer-

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ence has been noted and discussed.

My answer, then, is that regardless of who may be President of the United States, he will not dare to suggest the repeal of the Social Security Act or the contraction of its benefits. In fact, expansion of benefits can be expected with a heavy emphasis on the people's health.

October 7: Attending the dedication of the Abbott Laboratories' new research building at North Chicago, Illinois. The building itself is magnificent, with its suspended ceilings, with emergency showers in every doorway to use should the clothing of the research workers be set on fire, with its air conditioning and its sound absorbing—all these are accomplishments of the architect's and builders' skill. But more important than the conditioned air and the shiny equipment is the spirit that prevails in a research laboratory of this kind. One has the feeling here of an enormous cooperative venture. Here every person who contributes is equally as important as his fellow. The mechanics in the machine shops who never heard of hydrogen ion concentrations are as important in the scheme as the chemists in white. The city of rats, 3000 in number, who eat a ton of food a month, live in their clean, air conditioned quarters, and are fed distilled water have scrawny legs and sore eyes and deficiencies—the signs that research workers look for in developing drugs with which to correct dietary deficiencies in man. Their lives are lived well but these rats grow sick to make man better. The vagrant rat, on the other hand, contributes nothing but annoyance, unless it is the bubonic plague.

Outside is a corral of horses, also used in the study of human disease and for production of tetanus antitoxins. In the laboratories and in the factory itself, the cleanliness and the asepsis of a hospital prevail. Workers in white jackets, some in masks and caps are seen everywhere. The story of a pharmaceutic research laboratory, such as this, is told from grams to box cars. Infinitesimal quantities of drugs are assiduously mixed together, then produced in large quantities and shipped in box cars to the world. One cannot comprehend, for example, the magnitude of syphilis until he watches the endless stream of neoarsphenamine flowing forth day after day.

In the afternoon, President Clough of Abbott Laboratories, tells of the costs of war: 240 million were the costs a day in the World War. He compares the brutal science of war with the beneficent science of prevention. These 240 million dollars a day spent for war could build throughout the country hospitals, schools, hygienic homes.

The next spokesman was one of the famous Compton boys, Karl, the President of the Massachusetts Institute of Technology, whose mother was recently given an honorary degree for her contribution in raising such an outstanding family. Doctor Compton pointed out that inasmuch as research is subsidized less and less by private funds the government itself must spend money for pure research to advance the general welfare.

The able Surgeon General Parran later made the same observation. The function of the Public Health Program is putting medicine and the ancillary sciences to work for all the people. Doctor Parran says that public health has become a people's cause, the beginnings of a world stirring for health. He warned that we must, those of us who are in the health fields, be cautious to express opinions about things we know little and feel much; namely, the larger ramifications of socio-economics.

The top flight men of American science attended the dinner at the Palmer House where one speaker told the story of the triplets named Minnie, Lizzie, and Paderewski. "Minnie," said their father, "is the meanest; Lizzie is the laziest; and Paderewski is the pianist."

October 11: The invitation to the dedication of the Squibb Institute in New Brunswick, New Jersey could not be accepted because of conflicting engagements at home. The Institute of Medical Research is separate from the business activities of this company. At the Institute, fundamental research in the medical sciences will be carried on. The spirit of the dedicatory addresses might well be described by the quotation, "The proper study of mankind is man." As George R. Minot, M.D., a Nobel Prize winner in medicine, professor of medicine in Harvard University and Director of the Thorndike Memorial Laboratory, expressed it, "The control of experimental con-

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ditions in human beings is crude as compared to the utmost rigidity in the control of the worker in pure science, so that data of observations may be only qualitative or but crudely quantitative. One of the many variable factors is dependent on the fact that the human being has a soul and highly organized nervous system. His emotional reactions, worries, jealousies, and the like and his reaction to one or more persons cannot only lead to illness but affect the function of organs.

"The medical-social, psychological, economic, and allied aspects of individuals can be investigated with profit. The field is a difficult one for reliable scientific study because it involves all the complexities of human life. Even so, a considerable fraction of the successful care and treatment of patients and the prevention of illness is to be identified with the proper consideration of their medico-social problems."

Russell Wilder of the Mayo Foundation said, "What we have learned about dogs and rats exceeds what we know about ourselves. Doctor Minot made the same point when he said that in the cure and prevention of disease and pain, the final test was in man himself, so that a clinical investigative unit need be a part of and associated with an institute for medical research. At the Squibb Institute, Doctor Haropp, the Director, plans to carry on such clinical investigations. Minot, again, described the types of clinical investigators: "It is certainly an incorrect conception of research that it makes a man heartless, unsympathetic or indifferent to human suffering. Indeed, many able clinicians who have spent much time in investigation are unusually keen in their ability to appreciate and to treat wisely the anxieties and emotional disturbances of patients. In reality the clinical investigator is apt to be successful somewhat in proportion to his appreciation of the sick man as an individual. He is usually one who has some inborn quality which fits him for an earnest search for knowledge and who by proper training in a suitable environment develops his inquiring abilities. He must have the power to see straight, which is a rare gift. To see no more and no less than is actually before one, to see with one's reason as well as

with one's perceptions; that is, to be an observer and to read the book of nature aright. To note the resemblances of things one to another may be an essential point in acquiring information."

Occasionally, pure scientists sneer at people in business, not remembering that few of their investigations could be carried out without a subsidy whether from a state, a university, or by a private gift to an indicated college or university. Such purists forget that the funds available for their esoteric studies might have come from a meat packer or from a petroleum producer. In a capitalistic system such as ours, industry and science cannot be rigidly partitioned. Doctor Anderson, Director of the Biologic Laboratories of E. R. Squibb & Sons, made this point clear in his dedicatory address:

"Back in the early days of the past century, industry and research lived apart from each other. Each had qualities that the other lacked. Industry had aggressiveness, the ability to make the newly discovered things available to many. Research had imagination, curiosity and patience. Both had intelligence and each knew the meaning of hard work. For a long time they managed to get along quite well, each going its own way. Finally, Industry said, as it were, to Research, 'Why don't we form a partnership? You can find the answer to my questions and I can apply the things you discover to promote the health, happiness and welfare of all mankind.'

"When we visit a busy laboratory we may be more intrigued by the fascinating apparatus we see than by the men we meet, but the fascinating apparatus never invented anything; it has never brought a new idea into the world and it is only as useful and as good as the men who use it. The man in research, in whatever field he may be engaged, works to discover new facts and principles which, in the long run, will aid in making life happier, safer and more pleasant than in the past."—E. J. R.

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